```python
import pandas as pd
import numpy as np

b = pd.Series([1,2,4,5,6,6])

print(b)
```

```
→  0    1
   1    2
   2    4
   3    5
   4    6
   5    6
   dtype: int64
```

```python
s = pd.Series([1,2,3,4,5,6], index = [2,3,4,5,6,7])

print(s)
```

```
→  2    1
   3    2
   4    3
   5    4
   6    5
   7    6
   dtype: int64
```

```python
s.values
```

```
→  array([1, 2, 3, 4, 5, 6])
```

```python
s.index
```

```
→  Index([2, 3, 4, 5, 6, 7], dtype='int64')
```

```python
d = pd.Series([1,2,3], index = ['b','d','c'])

print(d)
```

```
→  b    1
   d    2
   c    3
   dtype: int64
```

```python
d['d']
```

```
→  np.int64(2)
```

```python
d['b']
```

```
→  np.int64(1)
```

```python
s = pd.Series(np.random.randint(1,100,100))

print(s)
```

```
→  0     17
   1     78
   2     71
   3     15
   4      4
         ..
   95     6
   96    17
   97    58
   98    19
   99    74
   Length: 100, dtype: int64
```

```python
s.head()
```

	0
0	17
1	78
2	71
3	15
4	4

dtype: int64

```
s.tail()
```

	0
95	6
96	17
97	58
98	19
99	74

dtype: int64

```
s.tail(2)
```

	0
98	19
99	74

dtype: int64

```
s.unique()
```

```
array([17, 78, 71, 15,  4, 62, 68, 39, 34, 60, 75, 89, 63, 85,  9, 74, 98,
       76,  6, 12, 46, 65, 22, 86,  7, 37, 88, 66, 33, 14, 44, 82, 72, 25,
       79, 42, 45, 30,  8, 67, 91, 53, 61, 94, 58, 35, 48, 96, 83, 31,  5,
       84, 27, 40, 47, 55, 49, 51, 28, 18, 87, 57, 19])
```

```
s.nunique()
```

63

```
s.value_counts()
```

	count
44	5
17	4
78	3
66	3
34	3
...	...
28	1
18	1
87	1
57	1
19	1

63 rows × 1 columns

dtype: int64

```
s.sum()
```

np.int64(4992)

```
s.mean()
```

⮕ np.float64(49.92)

```
s.max()
```

⮕ 98

```
s.min()
```

⮕ 4

```
s.argmin()
```

⮕ np.int64(4)

```
s.argmax()
```

⮕ np.int64(19)

```
s = pd.DataFrame([[10,20,23,40,34],['bala','roa','prakash','nitw']])
```

```
print(s)
```

⮕
```
        0    1        2     3     4
0      10   20       23    40  34.0
1    bala  roa  prakash  nitw   NaN
```

```
from google.colab import files
upload = files.upload()
```

⮕ [Choose Files] iris.csv
   • **iris.csv**(text/csv) - 4621 bytes, last modified: 9/4/2025 - 100% done
   Saving iris.csv to iris (1).csv

```
df = pd.read_csv('iris.csv')
```

```
df
```

⮕

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

Next steps: [Generate code with `df`]   [👁 View recommended plots]   [New interactive sheet]

```
type(df)
```

⮕
```
pandas.core.frame.DataFrame
def __init__(data=None, index: Axes | None=None, columns: Axes | None=None, dtype: Dtype |
None=None, copy: bool | None=None) -> None
```

/usr/local/lib/python3.12/dist-packages/pandas/core/frame.py
```
Two-dimensional, size-mutable, potentially heterogeneous tabular data.

Data structure also contains labeled axes (rows and columns).
Arithmetic operations align on both row and column labels. Can be
thought of as a dict-like container for Series objects. The primary
```

```
df.shape
```

```
(150, 5)
```

```
df.dtypes
```

	0
SepalLengthCm	float64
SepalWidthCm	float64
PetalLengthCm	float64
PetalWidthCm	float64
Species	object

dtype: object

```
df.columns
```

```
Index(['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',
       'Species'],
      dtype='object')
```

```
df.describe()
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

```
df.head()
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

Next steps: (Generate code with df) (⊙ View recommended plots) (New interactive sheet)

```
df.head(10)
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
5	5.4	3.9	1.7	0.4	Iris-setosa
6	4.6	3.4	1.4	0.3	Iris-setosa
7	5.0	3.4	1.5	0.2	Iris-setosa
8	4.4	2.9	1.4	0.2	Iris-setosa
9	4.9	3.1	1.5	0.1	Iris-setosa

Next steps: (Generate code with `df`) (⬤ View recommended plots) (New interactive sheet)

`df.tail()`

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

`df.tail(7)`

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
143	6.8	3.2	5.9	2.3	Iris-virginica
144	6.7	3.3	5.7	2.5	Iris-virginica
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

`df['SepalLengthCm']`

	SepalLengthCm
0	5.1
1	4.9
2	4.7
3	4.6
4	5.0
...	...
145	6.7
146	6.3
147	6.5
148	6.2
149	5.9

150 rows × 1 columns

dtype: float64

`df.isnull()`

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
...	...	...	...	...	...
145	False	False	False	False	False
146	False	False	False	False	False
147	False	False	False	False	False
148	False	False	False	False	False
149	False	False	False	False	False

150 rows × 5 columns

```
df.isnull().sum()
```

	0
SepalLengthCm	0
SepalWidthCm	0
PetalLengthCm	0
PetalWidthCm	0
Species	0

dtype: int64

```
a = df.drop(0)
```

```
a
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
5	5.4	3.9	1.7	0.4	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

149 rows × 5 columns

Next steps: (Generate code with `a`) (🔘 View recommended plots) (New interactive sheet)

```
a.head()
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
5	5.4	3.9	1.7	0.4	Iris-setosa

Next steps: (Generate code with a) (◉ View recommended plots) (New interactive sheet)

df.head()

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

Next steps: (Generate code with df) (◉ View recommended plots) (New interactive sheet)

df.sort_values(by='SepalLengthCm')

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
13	4.3	3.0	1.1	0.1	Iris-setosa
8	4.4	2.9	1.4	0.2	Iris-setosa
42	4.4	3.2	1.3	0.2	Iris-setosa
38	4.4	3.0	1.3	0.2	Iris-setosa
41	4.5	2.3	1.3	0.3	Iris-setosa
...	...	...	...	...	...
122	7.7	2.8	6.7	2.0	Iris-virginica
117	7.7	3.8	6.7	2.2	Iris-virginica
118	7.7	2.6	6.9	2.3	Iris-virginica
135	7.7	3.0	6.1	2.3	Iris-virginica
131	7.9	3.8	6.4	2.0	Iris-virginica

150 rows × 5 columns

df.sort_values(by='SepalLengthCm',ascending=False)

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
131	7.9	3.8	6.4	2.0	Iris-virginica
122	7.7	2.8	6.7	2.0	Iris-virginica
118	7.7	2.6	6.9	2.3	Iris-virginica
117	7.7	3.8	6.7	2.2	Iris-virginica
135	7.7	3.0	6.1	2.3	Iris-virginica
...	...	...	...	...	...
41	4.5	2.3	1.3	0.3	Iris-setosa
42	4.4	3.2	1.3	0.2	Iris-setosa
8	4.4	2.9	1.4	0.2	Iris-setosa
38	4.4	3.0	1.3	0.2	Iris-setosa
13	4.3	3.0	1.1	0.1	Iris-setosa

150 rows × 5 columns